

**SECTION 02260**  
**EXCAVATION SUPPORT AND PROTECTION**

**PART 1 - GENERAL**

**0.1 DESCRIPTION OF WORK**

- A.** Work Included: This Section specifies temporary soils excavation support and protection systems.
- B.** Related Work: The following items are not included in this Section and will be performed under the designated Sections:
  - 1. Section 02240 - DEWATERING; for dewatering excavations.
  - 2. Section 02300 - EARTHWORK; excavating and backfilling for existing utilities.
  - 3. Section 03371 - SHOTCRETE; for use in excavation support and protection.

**0.2 PERFORMANCE REQUIREMENTS**

- A.** Design, furnish, install, monitor, and maintain excavation support and protection system capable of supporting excavation sidewalls and of resisting soil and hydrostatic pressure and superimposed construction loads.
  - 1. Provide professional engineering services needed to assume engineering responsibility, including preparation of Shop Drawings and a comprehensive engineering analysis.
  - 2. Prevent surface water from entering excavations by grading, dikes, or other means.
  - 3. Install excavation support and protection systems without damaging existing buildings, pavements, and other improvements or facilities adjacent to excavation.
  - 4. Provide vibration monitoring to prevent impacts on adjacent structures and utilities.

**0.3 SUBMITTALS**

- A.** Shop Drawings: Prepared by or under the supervision of a qualified professional engineer for excavation support and protection systems.
  - 1. Include Shop Drawings signed and sealed by the qualified professional engineer responsible for their preparation.

- B.** Qualification Data: For Installer and professional engineer.
- C.** Photographs or videotape, sufficiently detailed, of existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by the absence of, the installation of, or the performance of excavation support and protection systems.

#### **0.4 PROJECT CONDITIONS**

- A.** Existing Utilities: Do not interrupt utilities serving facilities occupied by Authority or others unless permitted in writing by Engineer and then only after arranging to provide temporary utility services according to requirements indicated.
- B.** Project-Site Information: A geotechnical report has been prepared for this Project and is available for information only. The opinions expressed in this report are those of geotechnical engineer and represent interpretations of subsoil conditions, tests, and results of analyses conducted by geotechnical engineer. Authority will not be responsible for interpretations or conclusions drawn from this data.
  - 1. Make additional test borings and conduct other exploratory operations necessary for excavation support and protection.
  - 2. The geotechnical report is included elsewhere in the Project Manual.
- C.** Survey adjacent structures and improvements, employing a qualified professional engineer or land surveyor; establish exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.
  - 1. During installation of excavation support and protection systems, regularly resurvey benchmarks, maintaining an accurate log of surveyed elevations and positions for comparison with original elevations and positions. Promptly notify Engineer if changes in elevations or positions occur or if cracks, sags, or other damage is evident in adjacent construction.

#### **1.5 Quality Assurance**

- A.** Have a registered engineer approve and inspect all excavation support areas on a periodic basis.

### **PART 2 - PRODUCTS**

#### **0.1 MATERIALS**

- A.** General: Provide materials that are either new or in serviceable condition.

- B.** Structural Steel: ASTM A 36/A 36M, ASTM A 690/A 690M, or ASTM A 992/A 992M.
- C.** Steel Sheet Piling: ASTM A 328/A 328M, ASTM A 572/A 572M, or ASTM A 690/A 690M; with continuous interlocks.
- D.** Cast-in-Place Concrete: ACI 301, of compressive strength required for application.
- E.** Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.
- F.** Timber Piling: ASTM D 25, species listed in AWPAC3, pressure-treated in accordance with AWPAC3.
- G.** Seven Wire Strand: ASTM A 416, Grade 250 or 270, uncoated seven-wire, low-relaxation strand.
- H.** Grout: Suitable for service, minimum 4,000 psi.

### **PART 3 - EXECUTION**

#### **0.1 PREPARATION**

- A.** Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards that could develop during excavation support and protection system operations.
  - 1. Shore, support, and protect utilities encountered.
- B.** Install excavation support and protection systems to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.
  - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Engineer and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
- C.** Locate excavation support and protection systems clear of permanent construction so that forming and finishing of concrete surfaces is not impeded.
- D.** Monitor excavation support and protection systems daily during excavation progress and for as long as excavation remains open. Promptly correct bulges, breakage, or other evidence of movement to ensure that excavation support and protection systems remain stable.

- E. Promptly repair damages to adjacent facilities caused by installing excavation support and protection systems.

## **0.2 SOLDIER BEAMS AND LAGGING**

- A. Install steel soldier beams before starting excavation. Space soldier beams at regular intervals not to exceed allowable flexural strength of wood lagging. Accurately align exposed faces of flanges to vary not more than 2 inches from a horizontal line and not more than 1:120 out of vertical alignment.
- B. Install wales horizontally at spacings indicated on the approved shop drawings and secure to soldier beams.

## **0.3 SHEET PILING**

- A. Before starting excavation, install one-piece sheet piling lengths and tightly interlock to form a continuous barrier. Limit vertical offset of adjacent sheet piling to 60 inches. Accurately align exposed faces of sheet piling to vary not more than 2 inches from a horizontal line and not more than 1:120 out of vertical alignment. Cut tops of sheet piling to uniform elevation at top of excavation.

## **0.4 TIEBACKS**

- A. Tiebacks: Drill for, install, grout, and tension tiebacks into position. Test load-carrying capacity of each tieback and replace and retest deficient tiebacks.
  - 1. Test loading shall be observed by a qualified professional engineer responsible for design of excavation support and protection system.
  - 2. Maintain tiebacks in place until permanent construction is able to withstand lateral earth and hydrostatic pressures.
  - 3. Inspect tiebacks periodically to confirm anchors exhibit no movement.

## **0.5 BRACING**

- A. Bracing: Locate bracing to clear columns, floor framing construction, and other permanent work. If necessary to move brace, install new bracing before removing original brace.
  - 1. Do not place bracing where it will be cast into or included in permanent concrete work, unless otherwise approved by Engineer.
  - 2. Install internal bracing, if required, to prevent spreading or distortion of braced frames.

3. Maintain bracing until structural elements are supported by other bracing or until permanent construction is able to withstand lateral earth and hydrostatic pressures.

## **0.6 REMOVAL AND REPAIRS**

- A. Remove excavation support and protection systems when construction has progressed sufficiently to support excavation and bear soil and hydrostatic pressures. Remove in stages to avoid disturbing underlying soils or damaging structures, pavements, facilities, and utilities.
  1. Remove excavation support and protection systems to a minimum depth of 48 inches below overlying construction and abandon remainder.
  2. Repair or replace, as approved by Engineer, adjacent work damaged or displaced by removing excavation support and protection systems.

## **PART 4 - MEASUREMENT AND PAYMENT**

### **0.1 MEASUREMENT**

- A. No separate measurement will be made for excavation support and protection, but all costs in connection therewith shall be included in the lump sum price for excavation support and cleaning except as otherwise noted. All preparation and incidental work necessary to accomplish the installation will be considered incidental to the Lump Sum price.

### **0.2 PAYMENT**

- A. Payment for excavation support and protection will be made at the Contract lump sum prices as specified above.

### **0.3 PAYMENT ITEMS**

ITEM NO.	DESCRIPTION	UNIT
0221.418	SUPPORT OF EXCAVATON	LS

## **END OF SECTION**

## **NOTES TO THE DESIGNER**

- A.** Any request to modify or waive the specification requirements listed below must be approved in writing by the MBTA's Director of Design:

1. None